

MASTER'S DEGREE IN SUBSURFACE HYDROLOGY

ESCOLA DE CAMINS
Barcelona School of Civil Engineering



UNIVERSITAT POLITÈCNICA
DE CATALUNYA
BARCELONATECH

MASTER'S DEGREE IN SUBSURFACE HYDROLOGY

This master's program prepares you to lead the sustainable management of water resources, addressing the challenges of climate change and water scarcity with a comprehensive and technological approach. You will train as a specialist in a key field for the future, acquiring unique skills in Spain to design innovative solutions in hydrogeology, environmental protection, and aquifer restoration, at a School of Civil Engineering known worldwide.

The Master's Degree in Subsurface Hydrology (MsDSH) addresses the global and local urgent need to train experts capable of managing groundwater in the context of climate emergency and drought. It is the only specific degree in this field in Spain and integrates knowledge of geology, hydraulics, hydrogeochemistry, and advanced technologies.

The program offers interdisciplinary training to address Sustainable Development Goal (SDG) 6, preparing you to solve complex problems related to water availability and environmental quality with a resilient and forward-looking vision.

Which courses will you take?

This information is subject to change.
See the detailed curriculum at:
camins.upc.edu/en/studies

**60
ECTS**

1st semester

Hydrogeology for Sustainable Development	5
Field Techniques & Hydrogeophysics	5
Data Science & Applied Geostatistics in Hydrogeology	5
Modeling of Biogeochemical Processes	5
Hydrochemistry & contaminants in the natural Environment	5
Climate Change & Global Warming	5
Spatial Risk Analysis & Remote Sensing	5
Fundamentals of Geosciences & Geographic Information Systems	5

2nd semester

Natural Systems Dependent on Aquifers	5
Groundwater Flow & Contaminant Transport Modeling	5
Water Resources & Integrated Management	5
Geomechanics for Energy & Environment	5
Interaction of Groundwater with Civil Works	5
Reactive Transport Modeling	5
Master's Thesis	15

Teaching methodology

In this master's program, you will enjoy active and diverse training designed to connect theory with professional practice:

- Practical training: Experimental field and laboratory sessions with advanced instrumentation.
- Project-Based Learning (PBL): Solving real-world challenges and simulating complex cases.
- Seminars and technical visits: Direct contact with relevant business environments and facilities.
- Technology: Use of specialized software for numerical modeling and data analysis.

Graduate profile

Upon completion of this master's program, you will be a professional trained to:

- Identify and design technological solutions for the use and restoration of groundwater.
- Model hydrodynamic processes and contaminant transport in the subsurface.
- Manage water resource projects with an integrated, ethical, and sustainable approach.
- Apply advanced characterization techniques, both in the field and in the laboratory, to ensure water quality and availability.

Career opportunities

The water field demands highly specialized professionals. Key opportunities include:

- Water resources management: Planning and sustainable exploitation of aquifers in government agencies and private companies.
- Engineering and consulting: Design of wells, hydraulic works, and water management in civil engineering and mining.
- Environment and restoration: Soil and aquifer remediation projects, and protection of wetland ecosystems.
- Risk mitigation: Environmental impact assessments, drought mitigation, and saltwater intrusion analysis.

International recognition

Barcelona School of Civil Engineering has over 50 years of experience training hydrogeologists through the prestigious International Course on Groundwater Hydrology (CIHS), a leading program in Latin America and Europe. Furthermore, international rankings such as the QS World University Rankings and the NTU Ranking place us as the top Spanish university in Civil Engineering and within the European top 10, guaranteeing a high-quality and prestigious education.

Admission requirements

This master's program is aimed at graduates with a scientific or technical background, especially in the fields of:

- Civil, Geological, or Environmental Engineering
- Geology, Chemistry, Biology, and other related sciences.

You will find detailed information about the requirements on the master's program website.

Teaching

Teaching is in person, although you can choose to attend classes remotely during the second semester. Classes are taught in Spanish.

Master's Thesis

You will have the opportunity to develop, write, and defend a comprehensive project under personalized supervision. You will be able to develop an innovative project, a document synthesis, or experimental research that integrates all the skills you have acquired and connects you with the professional or academic world.

MASTER'S DEGREE IN SUBSURFACE HYDROLOGY

This program prepares you to lead the sustainable management of water, a critical resource in the era of climate change, equipping you with the tools to protect and restore our aquifers.

As the only specialized degree in Spain, it offers practical and multidisciplinary training that combines geology, engineering, and advanced modeling technologies.

Upon completion, you will be able to contribute innovative solutions to drought and pollution, with a profile in high demand in consulting, public administration, and research.

Barcelona School of Civil Engineering (Escola de Camins) is a higher education center known worldwide for civil, geological, and environmental engineering and recognized for both the quality of its teaching and the high-level research it conducts.

Barcelona School of Civil Engineering is a center of the Universitat Politècnica de Catalunya · BarcelonaTech (UPC), a renowned public research and higher education institution in the fields of engineering, architecture, science, and technology. With 50 years of history and more than 30,000 students, the UPC has the largest concentration of research and technological innovation in Southern Europe. It is the best university in Spain for Civil and Structural Engineering, according to the QS World Universities Rankings by Subject, 2022.



Your talent, leading your future

Further information:

camins.upc.edu/en/studies

admissions.masters.camins@upc.edu

www.upc.edu/sri/en/students

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